REMARKS

Reconsideration of the application is requested.

Claims 13 - 24 are now in the application. Claims 13 and 23 have been amended. Claims 1 - 12 had been canceled previously.

The amendments to claims 13 and 23 are supported in the specification as follows: In a first embodiment, mentioned in the paragraph bridging pages 3 and 4, the charge fed to the actuator may be adjusted without adjusting the overall charging period. This can be achieved by increasing or decreasing the steepness of the rise in the time periods one and three. Increasing the steepness, for example, means that the time periods one and three are shortened and, accordingly, the time period two (in the middle) is lengthened. In a second embodiment, mentioned on page 4, lines 5-11, it is possible to retain the first and third time periods unchanged. In order to increase the charge, then, the second time period is lengthened and in order to decrease the total amount of charge, the second time period is shortened.

These two embodiments have in common that the second time period (i.e., the second duration) is varied in order to vary the amount of charge or discharge.

The invention, as claimed, is concerned with providing for a “soft” landing (upon actuation in either direction) of the actuator, such as the ceramic piezo element. This is achieved by slowly leading into and out of the full charge (i.e., +Q) or discharge (i.e., -Q). The lead-in and lead-out defined by the first time period T1 and the third time period T3 may take a few current pulses, such as 5 – 10 pulses, for example.

See, for instance, page 7. The linear charging (or discharging) period T2 is disposed between the lead-in and lead-out. The length of the time period T2 defines the number of pulses of charge or discharge current. A longer time period T2 on the opening stroke of the piezo actuator, for instance, translates to a greater lift of the actuator or a longer full opening. Regardless of the time period T2, the framing time periods T1 and T3 assure that the charging and discharging current into and out of the actuator starts and ends "softly" and, accordingly, noise and impact stress on the ceramic is avoided to a great extent.

This brings us to the art rejection, in which claims 13-21 and 23 have been rejected as being anticipated by Chemisky et al. (WO 01/33061 A1, hereinafter "Chemisky") under 35 U.S.C. § 102. We respectfully traverse.

Chemisky, which is commonly owned with the instant application, indeed describes a related technology. The reference also deals with the charging and discharging of capacitive actuators. The charging circuit is formed as a modified flyback converter. The circuit of Chemisky takes several forms, including a circuit that charges and discharges according to the signal profiles of Fig. 4. The key to understanding the signal profiles lies in the diagram of the reference signal generator in the lower right-hand corner of Fig. 4. The corresponding element is the box 76 in Fig. 1, which receives the control signal ("Steuersignal") and outputs the reference signal.

The reference signal, in the embodiment of Fig. 4, is an RC-element with an inductance and a capacitor connected in series. The reference signal is tapped at a node between the two. The result is the cosine-shaped profile of the reference

signal, which represents the envelope of the charging current peaks. This leads to the generation of a sine-shaped piezo voltage. The flyback converter thus represents an LC endstage.

The charging voltage, therefore, does not have three distinguishable time periods (i.e., durations), but it only has a smoothed curve. In terms of a second derivative of the curve, there is a time period with a positive second derivative followed by a negative second derivative. The intervening time, by definition, approaches zero.

In terms of the pulsed current behavior, two adjacent pulses in the center of the charge current envelope may indeed have an equal amplitude. This, however, is only coincidental. Chemisky is concerned only with smoothing the charge signal curve in the embodiment of Fig. 4, but he does not intentionally smooth the lead-in and the lead-out times, while maintaining a linear charge signal during a second time period in between. In fact, Chemisky's circuits (i.e., the LC end stage of Fig. 4 or the RC end stage of Fig. 3) do not indeed show the charging process with the three time periods according to applicants' invention.

In order to even better emphasize the invention, we have added the "variability" of the second time period and its direct correlation with the charging of the actuator. Neither Chemisky nor any other prior art reference shows or suggests such a process.

Whether or not the microprocessor 91 of Fig. 5 could be employed to perform such a process does not need to be discussed here. There is nothing in Chemisky which

shows, or fairly suggests, the claimed method or the control circuit that processes such a method.

We have also reviewed the secondary reference Jansen et al. (US 2003/0067247) which was cited against claims 22 and 24. The secondary reference does not cure the shortcomings of the primary references as discussed above. These claims, and all other claims, are patentable over the combination of Chemisky with Jansen et al.

In view of the foregoing, reconsideration and the allowance of claims 13-24 are solicited.

Please charge any fees which might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner Greenberg Stemer LLP, No. 12-1099.

Respectfully submitted,

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